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September 16, 1983

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Subject: Byron Generating Station Units 1 and 2
Braidwood Generating Station Units 1 and 2
Charging Pump Deadheading
NRC Docket Nos. 50-454, 50-455, 50-456, and 50-457

References (a): I.E. Bulletin 80-18, dated July 24, 1980.

(b): September 9, 1983 letter from F. G. Lentine to H. R. Denton.

Dear Mr. Denton:

This is to provide additional details of changes being made at Byron and Braidwood stations to assure that minimum flow through the charging pumps will be maintained during all transients. Justification for interim operation of Byron 1 without completion of these changes is also provided. Appropriate FSAR revisions will be made at the earliest opportunity.

The charging pump deadheading problem originally came to our attention as described in reference (a). Conceptual design changes for Byron and Braidwood stations were described in reference (b). The final design description in Attachment A to this letter supersedes the description provided in reference (b). NRC review of this information should enable closure of Confirmatory Issue 16 in the Byron SER.

Current procurement and installation schedules indicate that the changes described here will be completed prior to fuel load for all units except Byron 1. The Byron 1 changes will be implemented as soon as practical but no later than during the first refueling outage. Until these changes can be completed, plant emergency procedures will require remote operation of the charging pump miniflow valves to assure adequate pump flow in all situations. These interim administrative controls are also described in Attachment A to this letter. Interim measures such as

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these are clearly contemplated in reference (a) and have been found acceptable at other plants. It is requested that the NRC confirm their acceptability for Byron 1 at the earliest opportunity.

Please direct further questions regarding this matter to this office.

One signed original and fifteen copies of this letter and the attachment are provided for NRC review.

Very truly yours,

T. R. Tramm

T. R. Tramm
Nuclear Licensing Administrator

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ATTACHMENT A

Centrifugal Charging Pump Deadhead Protection

Present Design

The present design of the centrifugal charging pumps and their function in the ECCS is described in FSAR Section 6.3. In the present design, the normally open miniflow isolation valves (CV8110 & CV8111) automatically close upon receipt of an "S" signal.

Design Changes

The final modified design to be implemented at Byron/Braidwood to protect against charging pump deadheading is depicted in Figure 1. Motor operated miniflow isolation valves CV8110 and CV8111 will be relocated to the individual sections of the miniflow lines. These valves will no longer close on an "S" signal. Rather, these normally open valves will remain open following an "S" signal until the suction of the ECCS pumps is transferred from the RWST to the containment sump. At that time, valves 8110 and 8111 will both be closed by the same automatic signal which opens sump valves 8811A/B, i.e., 2/4 low-low RWST level coupled with an "S" signal. The "S" signal will be latched in a retentive memory to ensure that the miniflow isolation valves will be closed automatically even though the operator must reset safety injection at the main control board master reset prior to recirculation. The local retentive memories for valves 8110/8111 will be the same as those used for the sump recirculation valves 8811A/B because of the similarity of the functions and the fact that the retentive memories would be reset at the same time for both sets of valves.

Closure of the miniflow isolation valves 8110 and 8111 prior to recirculation from the containment sump avoids the necessity of upgrading the design/operating pressure of the miniflow loop to withstand the higher pressures which can result if the charging pump suction is boosted by the low head SI pumps with the miniflow open. The miniflow valves can be closed at this time because charging pump deadheading is no longer a concern by the time the RWST has been exhausted. Although the miniflow control valves 8114/8116 should have been closed automatically by this point in the transient, the failure of one of these valves to close (either because of a valve or power failure) requires redundant isolation of the downstream valves.

New Class 1E solenoid operated miniflow globe isolation valves CV8114 and CV8116 will be added to the individual sections of the miniflow lines upstream of the relocated motor operated miniflow isolation valves. These valves will be normally open, but in the presence of an "S" signal, they will automatically close on low RCS pressure and automatically open on high RCS pressure. Two distinct and separate open/close setpoints have been chosen as opposed to a single setpoint to minimize the possibility that an oscillating pressure signal for a given event might cycle the miniflow control valves repeatedly. With the

spring-return-to-auto control switch in auto, a low RCS pressure signal will, in the presence of an "S" signal, energize the solenoid to isolate the pump miniflow. The closure signal is latched such that the valve remains closed if a subsequent increase in RCS pressure causes the low pressure closure signal to disappear. If RCS pressure increases above the open setpoint with the "S" signal present, the valve energize circuit will be broken and valve opened. The valve will remain de-energized (open) until RCS pressure again decreases to the closure setpoint. The RCS pressure signal will operate the miniflow control valves only in the presence of a safety injection signal. An individual retentive memory with manual reset will be provided for each new miniflow valve. If the operator resets safety injection to take control of the transient, the miniflow valves will remain under automatic control until deliberate action is taken to reset the retentive memory.

Other instrumentation to be added includes safety related control board indication of the seal water heat exchanger outlet temperature and a high temperature alarm. In addition, control board indication of the component cooling water flow through the seal water heat exchanger and a low flow alarm will be provided.

Byron 1 Interim Operation

Due to the long lead time for procuring valves and transmitters, it will not be possible to have this modification completely installed and tested prior to the fuel load date for Byron Unit 1. All of the hardware to complete this modification will not be available until September, 1984. At this time, it is feasible to relocate the existing motor operated miniflow isolation valves (CV8110 and CV8111) to the individual pump miniflow lines and to terminate the "S" signal and 2 out-of 4 low-low RWST signal to these valves. This work will be completed and tested prior to fuel load.

Until the remainder of the hardware is delivered and installed, charging pump deadheading can be prevented in the interim with the relocated miniflow isolation valves in the open position during normal operations and upon receipt of an "S" signal. Appropriate instructions will be included in the emergency operating procedures to advise the operator when to operate the miniflow isolation valves. These instructions will be included in BEP 0 "Reactor Trip or Safety Injection", BEP 1 "Loss of Coolant Accident", and BEP 3 "Steam Generator Tube Rupture":

- Close miniflow isolation valves CV8110 and CV8111 if the wide range RCS pressure drops to approximately 1400 psig (when the reactor coolant pumps are tripped).
- Re-open miniflow isolation valves CV8110 and CV8111 if wide range RCS pressure subsequently increases above 2000 psig.

This procedural approach is consistent with what has been accepted by the NRC on an interim basis for operating plants. We are exercising all possible efforts to improve delivery dates and will install the balance of the equipment at the earliest practical opportunity, but no later than the first refueling outage for Byron 1.

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FIGURE 1

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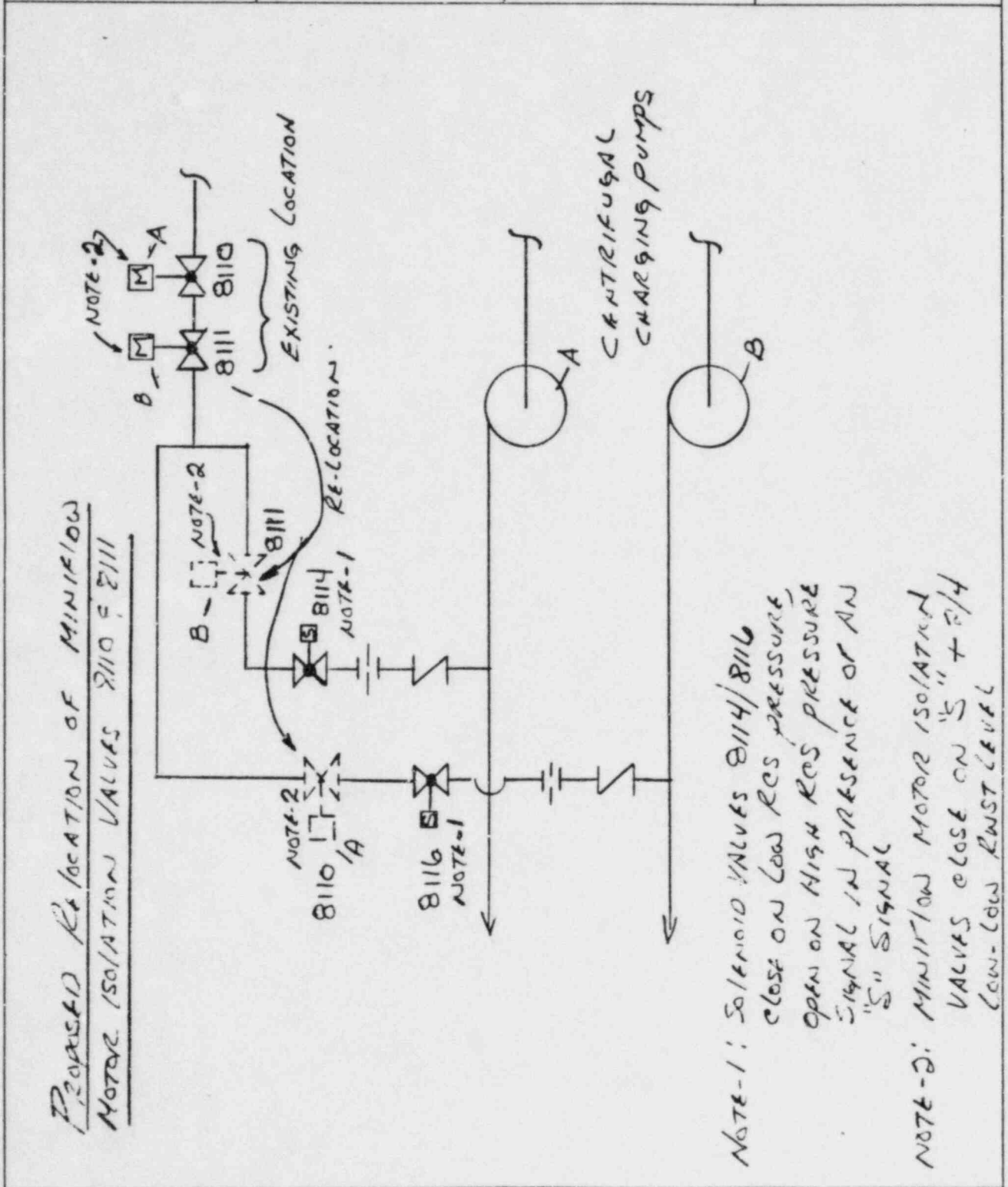

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